

ABSTRACT OF THE DISCLOSURE

The present invention provides a low dielectric constant copper diffusion barrier film suitable for use in a semiconductor device and methods for fabricating such a film. Some embodiments of the film are formed of a silicon-based material
5 doped with boron. Other embodiments are formed, at least in part, of boron nitride. Some such embodiments include a moisture barrier film that includes oxygen and/or carbon. Preferred embodiments of the copper diffusion barrier maintain a stable dielectric constant of less than 4.5 in the presence of atmospheric moisture.